

Navy Energy Strategy

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OPNAV N43E

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Energy consumption growing



today

... to unprecedented demands



2030



We all deal with pain & uncertainty at the pump

Today

\$2.05/gallon

Cost to fill up: **\$24.60**

Hybrid Car

Fuel tank: 12 gallons



Last Summer (& the Future?)

\$4.11/gallon

Cost to fill up: **\$49.32**

Distance on a tank: 612 miles

Assume 51 MPG Highway

SUV

Fuel tank: 26 gallons



Cost to fill up: **\$53.30**

Cost to fill up: **\$106.86**

Distance on a tank: 494 miles

Assume 19 MPG Highway

\$1.65/gallon
(F-76 DESC Price)

Cost to fill up:
\$742,500

Navy DDG-51

Fuel tank: 450,000 gallons



\$4.06/gallon
(F-76 DESC Price)

Cost to fill up:
\$1,827,000

Distance on a tank: 5060 (statute) miles

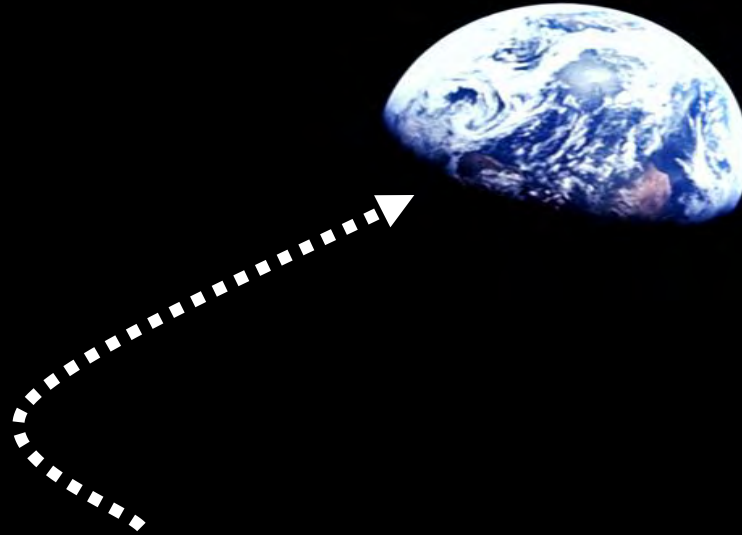
Navy's fuel costs can range from \$1 billion to over \$5 billion due to volatile oil prices

Energy is at the core of the Navy...



Navy video
(click to play)

“How inappropriate to call this planet
Earth when it is quite clearly Ocean”
- Arthur C. Clarke

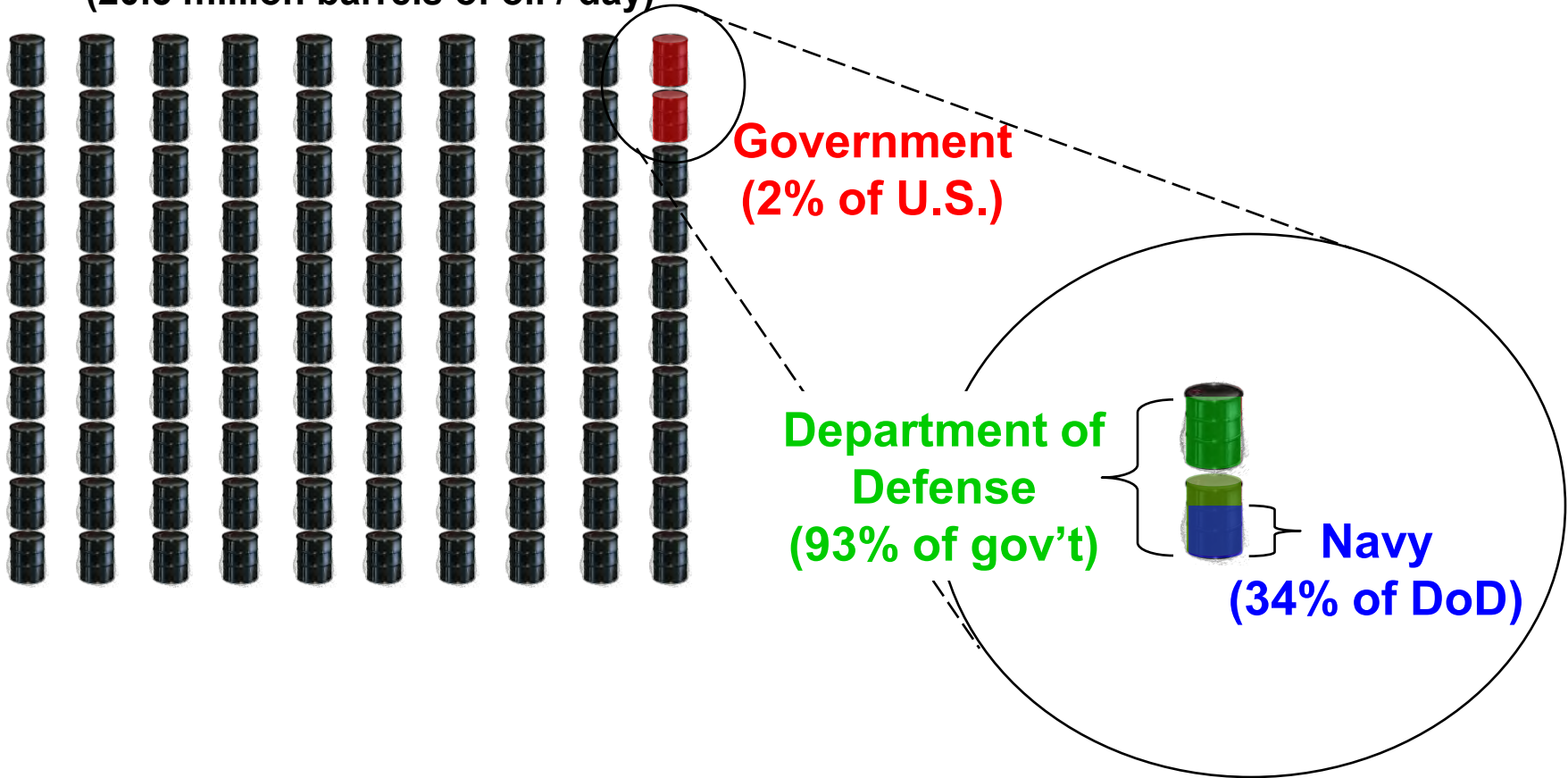


Global Fuels shipments by ocean are approximately
66 M bbl/day (almost 80% of the world's fuel trade)



U.S. Petroleum Consumption

Total U.S. Petroleum Consumption
(20.5 million barrels of oil / day)

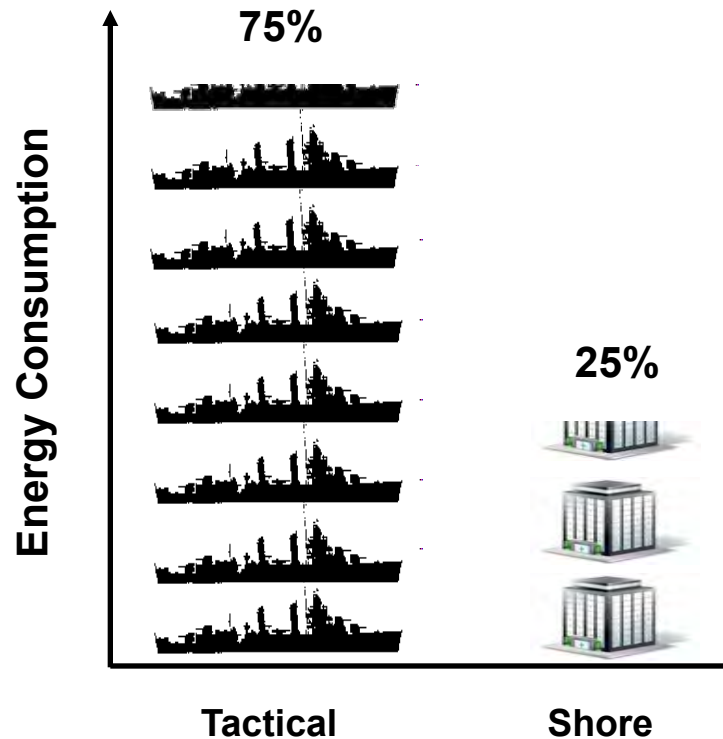


DoD is not a market maker, but it is the largest government and individual consumer and can serve as a technology leader

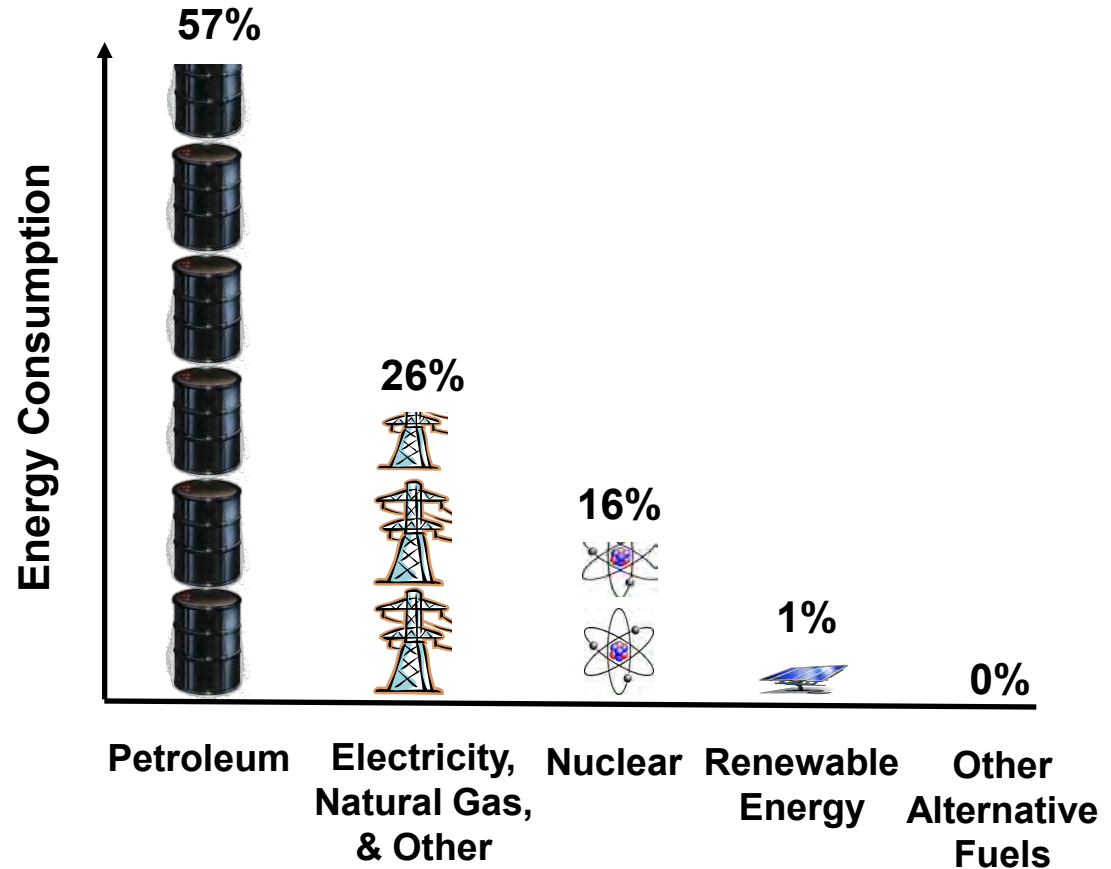


2008 Navy Energy Consumption & Sources

Consumption



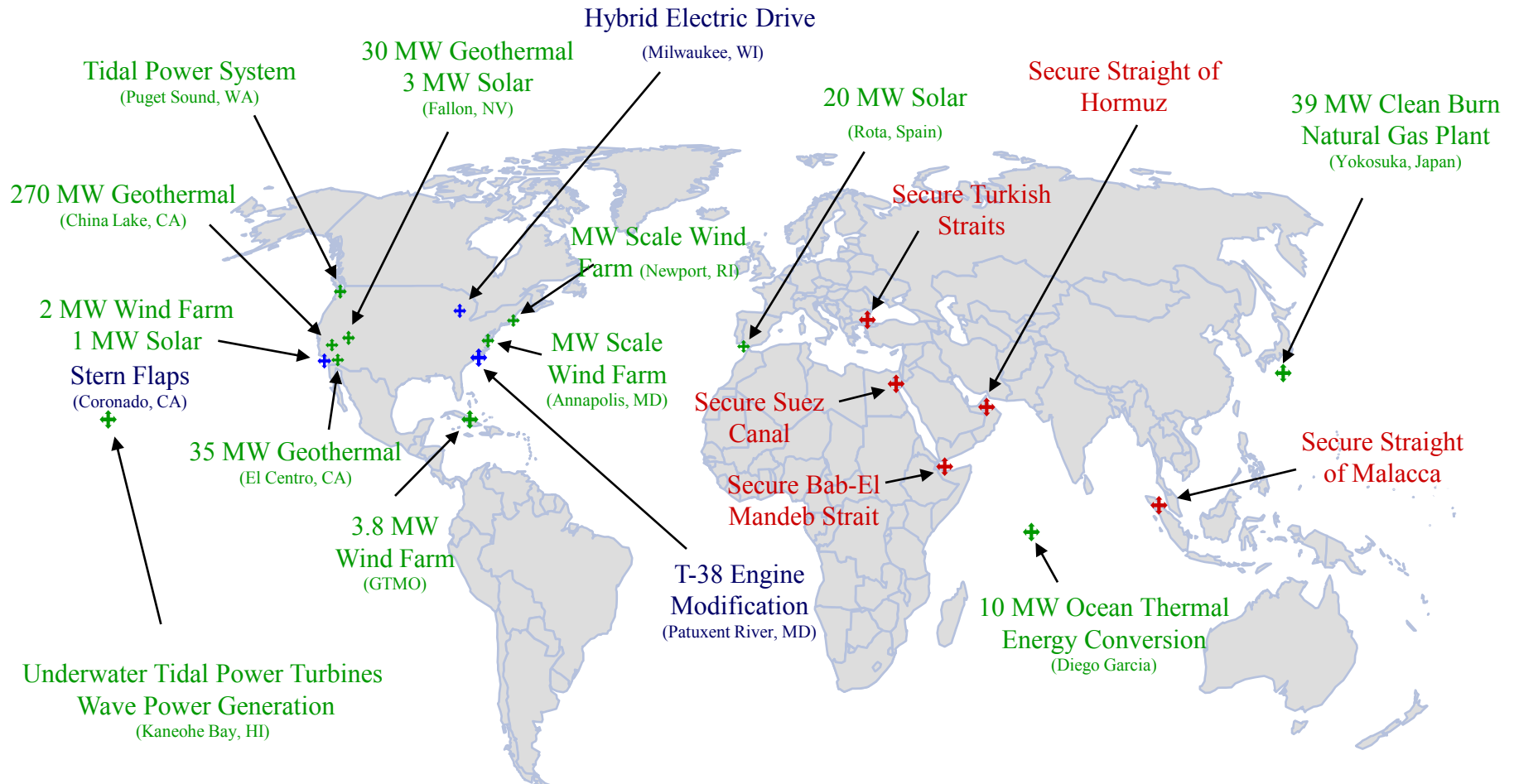
Sources



Navy energy use is dominated by petroleum from its tactical operations



Navy Energy Activities Span the Globe



Shore = green text

Tactical = blue text

Maritime Energy Security = red text

Saved over 5 M barrels of oil equivalent in 2008



Shore Successes



China Lake Geothermal Power Plant, 270 MW, since 1987



North Island Solar Power array on parking garage, 1 MW



Guantanamo Bay Wind Farm, 3.8 MW



Shore Successes



Camp Pendleton, CA GM Equinox Fuel Cell Test Vehicles



Maritime Successes



Incentivized Energy Conservation Program (i-ENCON)



Advanced Hull Coatings



Stern Flaps



Propeller Pitch Control



Aviation Successes



Efficient GE-38 Engine for CH-53K Helicopter



Training Simulators



Truck Refueling vice Hot Pit Refueling









Navy Energy Strategy



Navy developing holistic energy strategy to turn energy from a liability into an operational advantage



Navy Energy Strategy - Goals for 2020

Shore	Tactical	Environmental Stewardship
  Shore Energy Independence up to 60%	  Tactical Energy Independence up to 20%	  CO ₂ Emissions up to 20%
<i>"Shore energy reduction is an opportunity not only for the Navy, but it can also demonstrate to the Nation what is truly possible." (Flag Officer)</i>	<i>"Energy will be seen as a Tactical Advantage..." (Flag Officer)</i>	<i>"Carbon footprint reduction and environmental stewardship will be the way of the future Navy" (Flag Officer)</i>

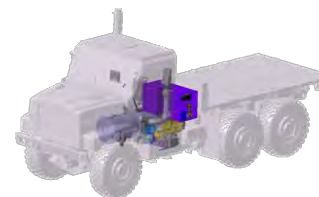
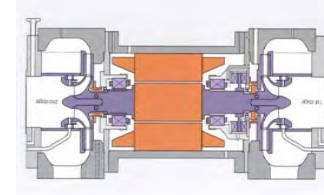
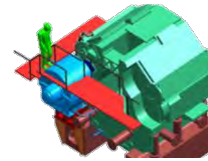
Mission First, Energy Always



American Recovery and Reinvestment Act of 2009

Navy Energy Investment Areas

- ▶ Fuel Optimization for Mobility Platforms
- ▶ Operational Efficiencies / Commercial Practices
- ▶ Facility Energy Initiatives
- ▶ Domestic Energy Supply / Distribution
- ▶ Tactical Power Systems / Generators



Total of \$450 M for Navy energy



<http://www.defenselink.mil/recovery>



American Recovery and Reinvestment Act of 2009

Aviation Investment Areas



Biofuels Test & Certification



Aircraft Engine Efficiency

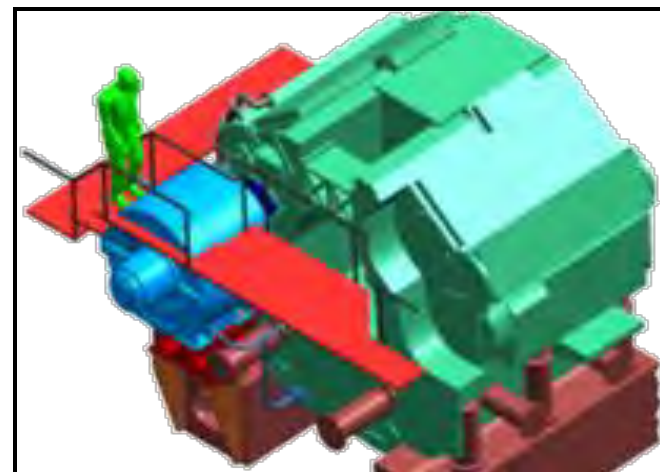


American Recovery and Reinvestment Act of 2009

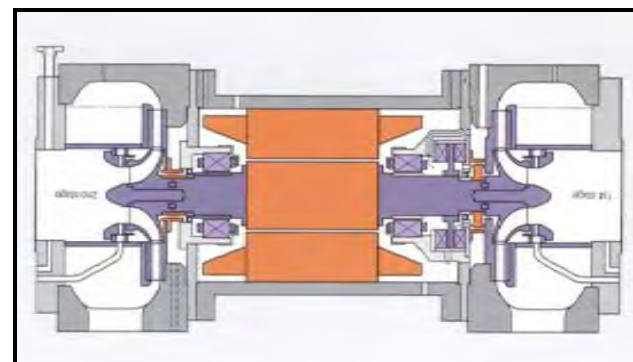
Maritime Investment Areas



Shipboard Stability Control



Hybrid Electric Drive System



Efficient Shipboard HVAC



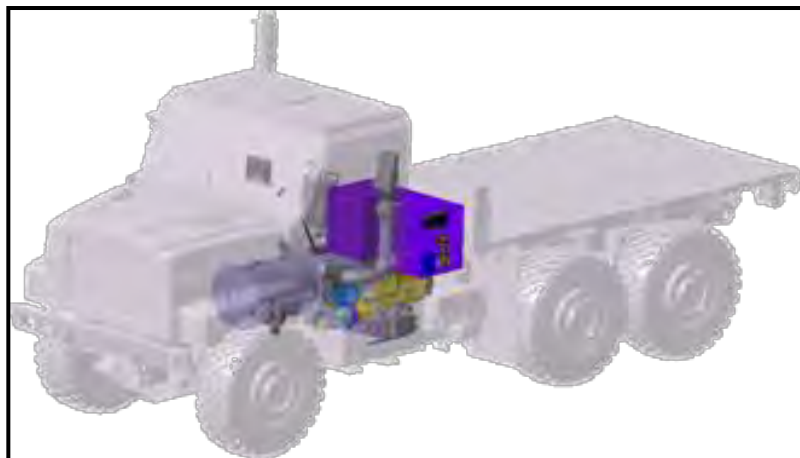
American Recovery and Reinvestment Act of 2009

Shore & Expeditionary Investment Areas

Diego Garcia (initial planned site)



**Ocean Thermal Energy Conversion and
Wave Energy Utilization**



On-Board Vehicle Power Generation



Energy Efficient HVAC Systems



Facilities Energy Investment: Advanced Metering Infrastructure (AMI)



Smart Meters



Wireless Energy Consoles

Gearing up for the future Smart Grid



Other Public Engagements

- **Navy & Industry Energy Summit**
In partnership with Office of Naval Research (October 2009)
- **Navy Week, St. Louis**
April 22 public event



NAVY WEEK
St. Louis
April 22, 2009

- **Other Academic, Professional, and Public Events**

*Partnering with you is key to our success and
will lead to energy advancements that will benefit us all*



Summary

- As the world's energy needs increase, the Navy will do its part to secure the flow of energy and to reduce its own energy use
- The Navy has been an early adopter of energy technologies for its shore installations and will leverage its energy experience to be at the forefront of America's renewed push for energy independence and sustainable clean energy
- As it formalizes its energy strategy, the Navy looks forward to working with other government agencies, academia, industry, and other stakeholders as we tackle America's energy challenges together